Virginia Department of Emergency Management

HAZARD RISK & VULNERABLE POPULATIONS

2021 HAZARD MITIGATION ASSISTANCE GRANTS EQUITY WORKSHOPS

The Deloitte Health360 Solution informs population vulnerability and enables a data-driven approach to operationalizing equity in mitigation projects. It is broken down into two components: Population Vulnerability and Hazard Risk. Both components are added together to identify potential priority areas to support future mitigation projects.

POPULATION VULNERABILITY

Provides a people-focused metric that can be combined with infrastructure, elevation, and financial metrics to support a holistic approach to mitigation planning.

HAZARD RISK

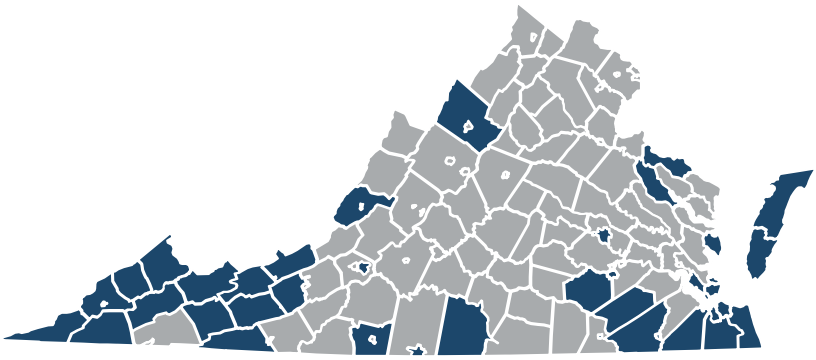
Reflects the number of households in each flood or hurricane zone weighted by risk severity to provide a people-focused risk metric.

PRIORITIZED CENSUS TRACTS

Combining population vulnerability and hazard risk at a sub-locality level can identify potential priority areas to support with future mitigation projects.

SERIES OBJECTIVES

1. Interpret data from the Deloitte Analysis and identify flooding risk in these areas.
2. Understand and explore potential solutions to hazard risk areas and vulnerable populations.
3. Educate stakeholders on funding programs such as FEMA hazard mitigation grants, CDBG grants, and the new CFP fund.
4. Discuss next steps, technical assistance needs, and training.



40 Localities Identified Scoring Over 70%

REGISTRATION https://odu.co1.qualtrics.com/jfe/form/SV_dd549WZWcIKVz3E

QUESTIONS? vdemgrants@vdem.virginia.gov

HAZARD RISK & POPULATION VULNERABILITY

Virginia Department of Emergency Management

SUBREGIONAL WORKSHOP

July 13, 2021 from 10am to 12pm

Buena Vista
Rockingham

POPULATION VULNERABILITY

Provides a people-focused metric that can be combined with infrastructure, elevation, and financial metrics to support a holistic approach to mitigation planning.

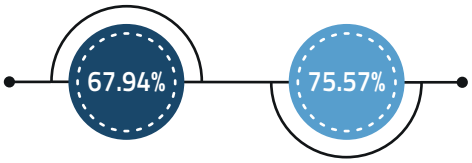
HAZARD RISK

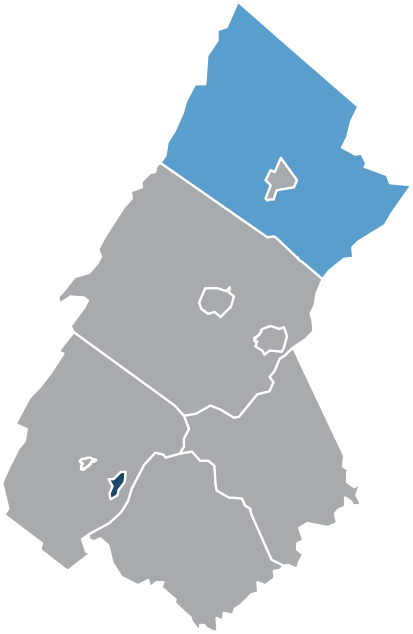
Reflects the number of house-holds in each flood or hurricane zone weighted by risk severity to provide a people-focused risk metric.

PRIORITIZED CENSUS TRACTS

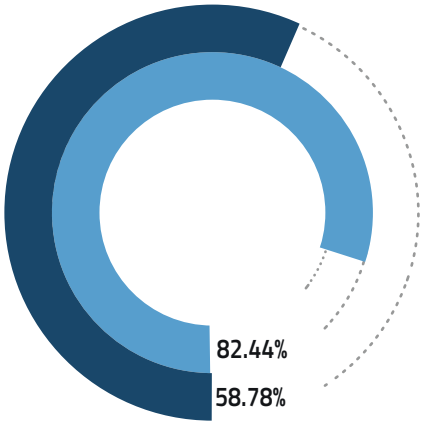
Combining population vulnerability and hazard risk at a sub-locality level can identify potential priority areas to support with future mitigation projects.

OVERALL PERCENTILE

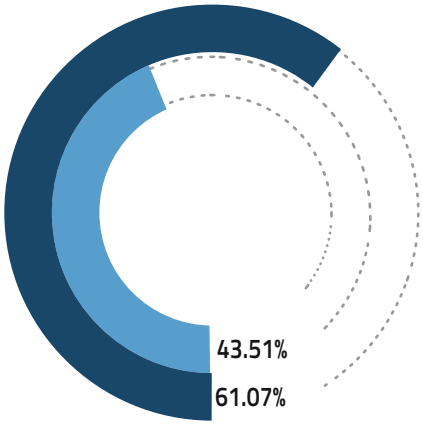




HAZARD RISK PERCENTILE



POPULATION VULNERABILITY PECENTILE



FACILITATED BY The Virginia Modeling, Analysis, and Simulation Center

COVID-19 Unified Command/VEST Health Equity Working Group

MITIGATION PROJECTS ANALYSIS
ROCKINGHAM COUNTY

NOVEMBER 2020

Topics

The analysis provides **Rockingham County** with information to support planning and preparation of projects for the Building Resilient Infrastructure and Communities (BRIC) grant application with an equity focus.

- ❑ Introduction to Data-Driven Approach
- ❑ Hazard Risk
- ❑ Population Vulnerability
- ❑ Prioritization
- ❑ FEMA Funding and Past Projects
- ❑ Considerations for Next Steps

This analysis ***expands the scope of population vulnerability*** to provide a ***data-driven equity lens*** for disaster mitigation project design

Data-Driven Approach

The Health360 platform informs population vulnerability and enables a data-driven approach to operationalizing equity in mitigation projects.

Powered By Health360

230M+
U.S. Adults Scored

Data updated every
1 Month

Contains over
1,500+
variables on Social Determinants of Health and other metrics

150+
Advanced predictive algorithms

400+
Variables used in the mortality predictive algorithm

Provides 360° view of a person

Algorithms rebuilt every 2 years

40+
Clients served

What is hazard risk and how is it calculated?

Household Hazard risk reflects the number of households in each flood or hurricane zone, weighted by severity.

Hazard Risk

Number of households in each zone:

Flood zones
- 100 year coastal
- 100 year riverine flood way
- 100 year riverine
- 500 year riverine

Hurricane zones
- Segmented A, B, C, D

- Households that reside in the flood and hurricane zones are considered to be **at-risk for environmental disasters**
- Hazard Risk reflects **the number of households located in Flood and Hurricane Zones**
- Hazard Risk is not a measure of **infrastructure, elevation, or financial risks**, but is a measure of the number of at-risk households in an area, weighted by the severity of the risk, to **provide a people-focused risk metric**

Note: Severity of the risk per household is captured on an ordinal scale from 1 – least severe (Hurricane Zone D, 500 Year Riverine) to 4 – most severe (Hurricane Zone A, 100 Year Coastal)

Hazard Risk = (# of Households in Particular Hurricane or Flood Zones) X (Specified Zone Risk Level (1 through 4 depending on risk severity))

Hazard Risk in Your Locality

The figures below indicate how your locality's hazard risk[1] compares to others in Virginia as well as how many households reside in each flood or hurricane zone.

Hazard Risk[1] Percentile

82nd

Your locality has more households in more severe flood/hurricane zones than 82% of other Virginia localities

Hazard Risk[1] Rank

24th

Your locality's Hazard Risk score is ranked 24th out of 132 Virginia localities

Households in Flood Zones & Locality Rank

← Severity			
100 Year Coastal	100 Year Riverine Floodway	100 Year Riverine	500 Year Riverine
0	38	1,220	674
N/A out of 132 Localities	30th out of 132 Localities	13th out of 132 Localities	17th out of 132 Localities

Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk

Households in Hurricane Zones & Locality Rank

← Severity			
Zone A	Zone B	Zone C	Zone D
0	0	0	0
N/A out of 132 Localities	N/A out of 132 Localities	N/A out of 132 Localities	N/A out of 132 Localities

Evacuation zones designated as A through D are in place across coastal Virginia

1. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity
2. Note that the total sum of households may be more than the households in your locality because some are located in both flood and hurricane zones

What is population vulnerability and how is it calculated?

The Population Vulnerability score provides a people-focused metric that can be combined with infrastructure, elevation, and financial metrics to support a holistic approach to mitigation planning.

Population Vulnerability

Prevalence of:

1. Communities of color
2. Elevated health risk
3. Low income
4. # of people in household
5. # of children in household
6. Unemployment risk
7. Age (older adults)
8. Lack of vehicle access

- Population Vulnerability **expands upon the 2018 Virginia Hazard Mitigation plan definition** of population vulnerability (density and percentage of total population)
- Population Vulnerability **only considers localities with households in flood or hurricane zones (132 localities)**
- Population Vulnerability **identifies the locality and census tracts/census blocks** with the most vulnerable individuals/households on average
- Population Vulnerability should be interpreted as a **household's ability to safely respond** to an environmental disaster

Population Vulnerability in Your Locality

The figures below indicate how your locality's population vulnerability[1] score and composite attributes compare to other localities in Virginia.

Population Vulnerability[1] Percentile

44th

On average, a household in a flood or hurricane zone in your locality is more vulnerable than a household in 44% of other Virginia localities

Population Vulnerability[1] Rank

75th

Your locality's Population Vulnerability score is ranked 75th out of 132 Virginia localities

How ROCKINGHAM COUNTY Compares to Other Localities Across the Eight Vulnerability Attributes

Low Income	Elevated Health Risk	Age	Communities of Color
45th percentile	**50th** percentile	**48th** percentile	**21st** percentile

# of Children in Household	# of People in Household	Unemployment Risk	Lack of Vehicle Access
79th percentile	**79th** percentile	**34th** percentile	**63rd** percentile

1. Population Vulnerability should be interpreted as a household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones

Using Population Vulnerability & Hazard Risk to Prioritize Census Tracts

Combining population vulnerability and hazard risk at a sub-locality level can identify potential priority areas to support with future mitigation projects.

Population Vulnerability

Prevalence of:

1. Communities of color
2. Elevated health risk
3. Low income
4. # of people in household
5. # of children in household
6. Unemployment risk
7. Age (older adults)
8. Lack of vehicle access

+

Hazard Risk

Number of households in each zone:

Flood zones

- 100 year coastal
- 100 year riverine floodway
- 100 year riverine
- 500 year riverine

Hurricane zones

- Segmented A, B, C, D

=

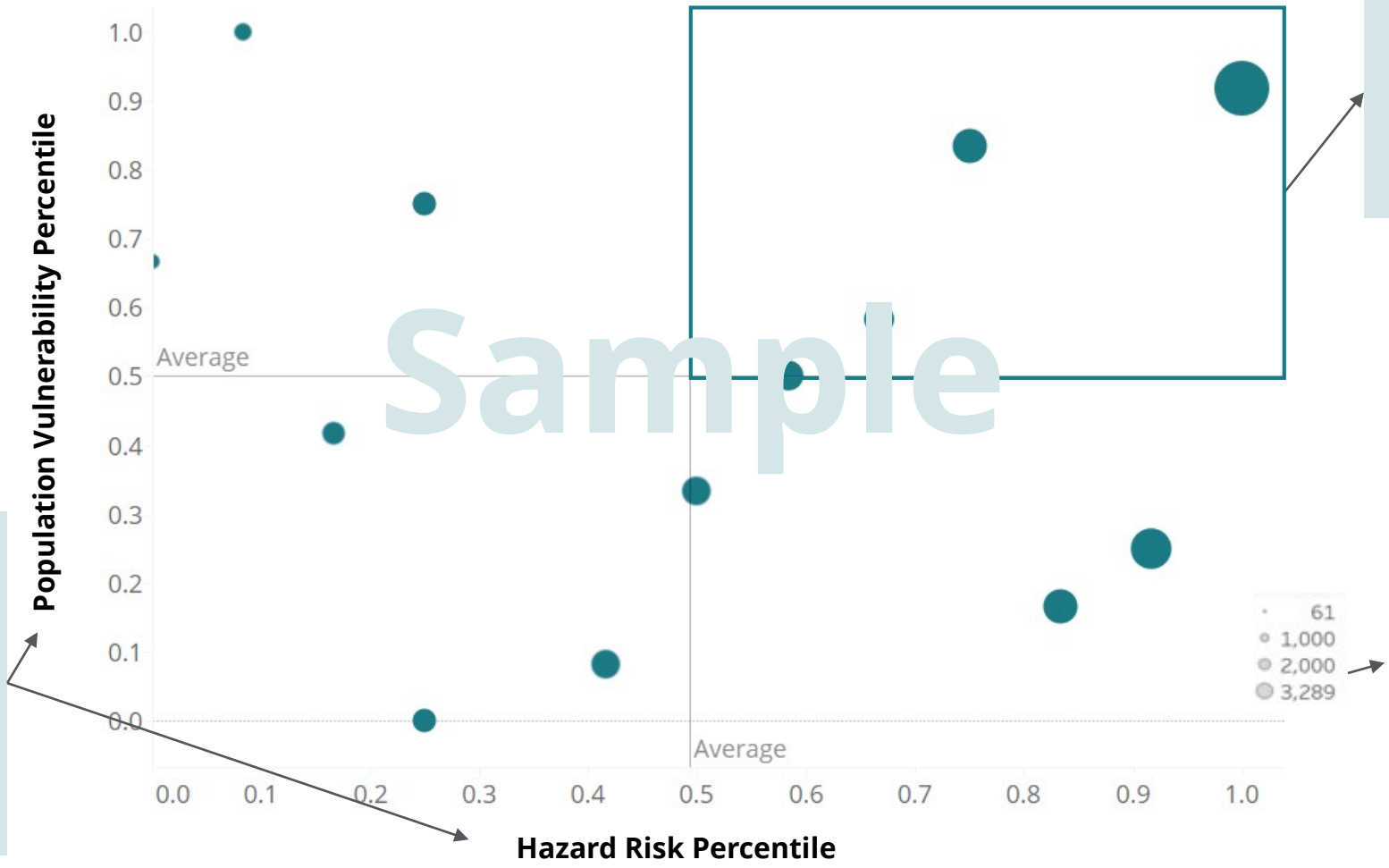
Prioritized Census Tracts

- High Population Vulnerability
- High Hazard Risk

Census tracts with both more households in severe flood/hurricane zones AND households with more vulnerable occupants

How to interpret the Census Tract plots

The chart below represents a *sample* locality and offers guidance on how to interpret the information when planning mitigation efforts.



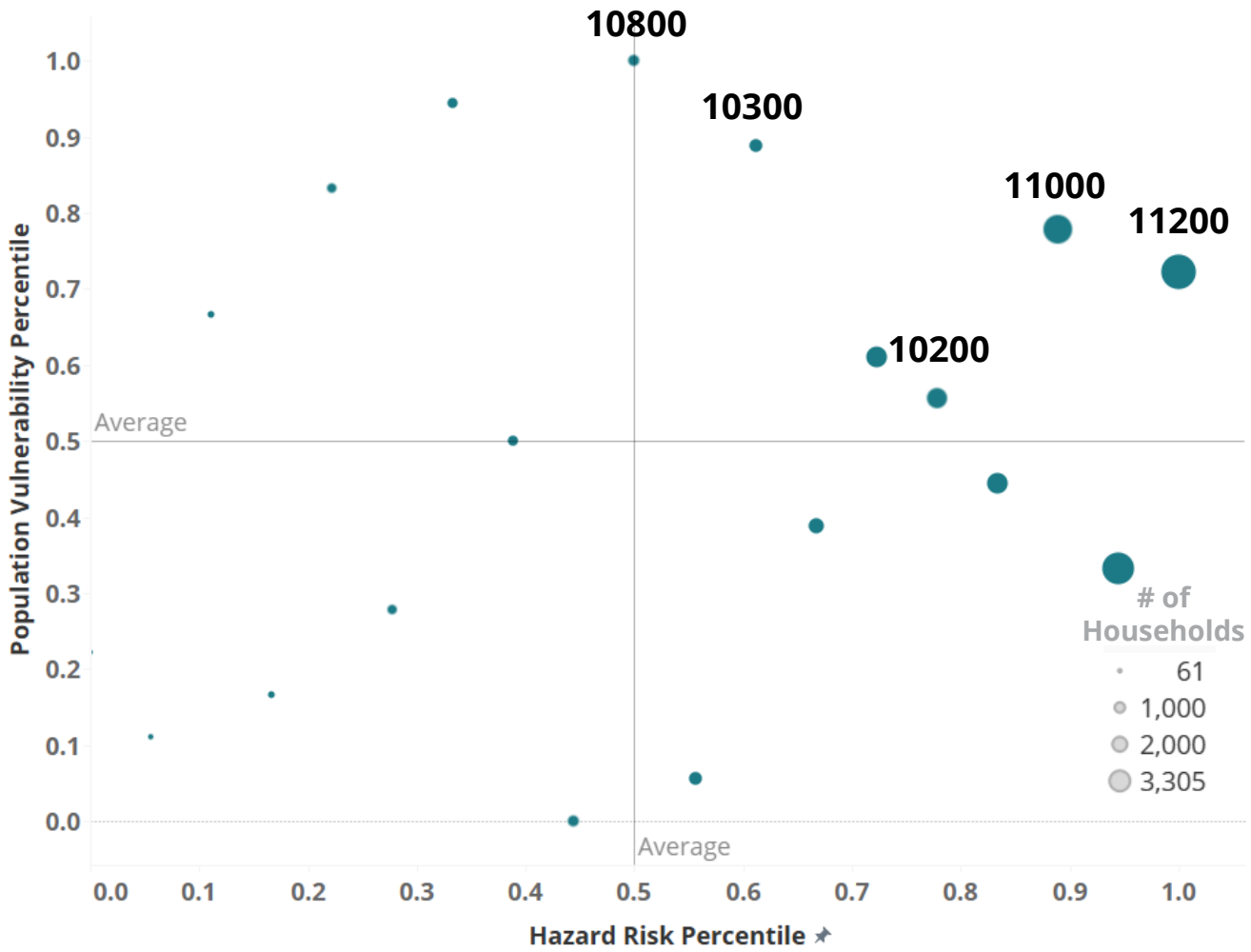
Circles in the upper right quadrant represent areas that you might consider prioritizing due to high population vulnerability and hazard risk

The x- and y-axes measure the percentiles of hazard risk and population vulnerability for each area

Size of the circle indicates the number of households in each area

Prioritizing Census Tracts in Rockingham County

Areas with the most vulnerable populations and households in severe flood and hurricane zones present prioritization opportunities for mitigation projects.



Priority Areas in Flood and Hurricane Zones

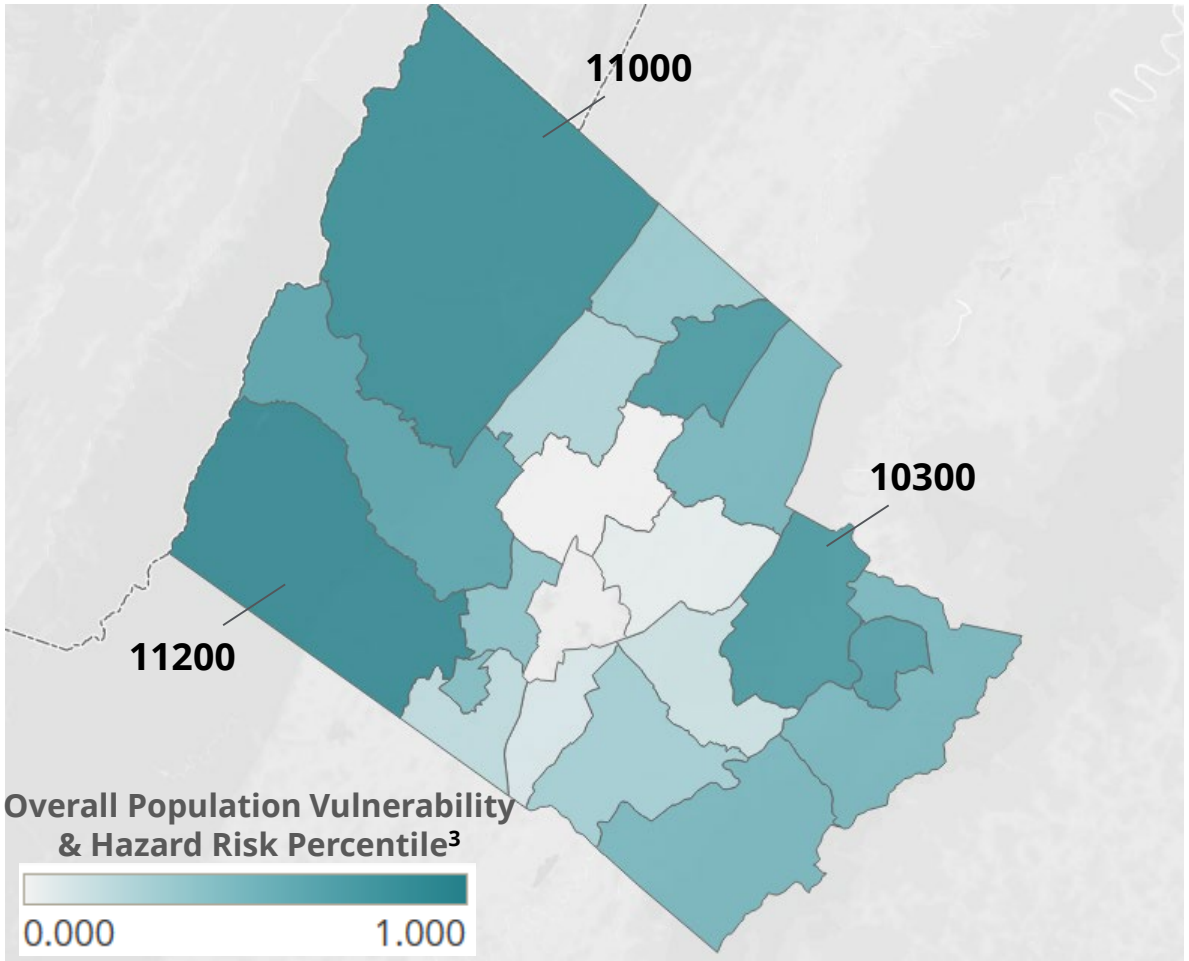
			Within-Rockingham County Percentiles		
#	Area	# of Households	Overall Percentile	Population Vulnerability[1] Percentile	Hazard Risk[2] Percentile
1	11200	407	100th	72nd	100th
2	11000	280	94th	78th	89th
3	10300	57	83rd	89th	61st
4	10800	51	83rd	100th	50th
5	10200	138	78th	56th	78th
6	11100	146	72nd	61st	72nd
7	12000	344	56th	33rd	94th
8	10100	146	56th	44th	83rd

1. Population Vulnerability should be interpreted as a household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones
2. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity

Prioritizing Census Tracts in Rockingham County continued

Areas with the most vulnerable populations and households in severe flood and hurricane zones present prioritization opportunities for mitigation projects.

Potential Priority Areas in Rockingham County



Priority Areas in Flood and Hurricane Zones

			Within-Rockingham County Percentiles		
#	Area	# of Households	Overall Percentile	Population Vulnerability[1] Percentile	Hazard Risk[2] Percentile
1	11200	407	100th	72nd	100th
2	11000	280	94th	78th	89th
3	10300	57	83rd	89th	61st
4	10800	51	83rd	100th	50th
5	10200	138	78th	56th	78th
6	11100	146	72nd	61st	72nd
7	12000	344	56th	33rd	94th
8	10100	146	56th	44th	83rd

1. Population Vulnerability should be interpreted as a household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones
2. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity
3. Sub-localities at the 0th percentile (areas in white) do not have households in Flood or Hurricane Zones

Priority Census Tracts Summary

When evaluating future mitigation project opportunities, it may be helpful to consider the underlying attributes of population vulnerability and the number of houses in each flood/hurricane zone.

			Within-Rockingham County Percentiles										
#	Census Tract	# of Households	Overall	Population Vulnerability[1]	Communities of Color	Elevated Health Risk	Low Income	# of People	# of Children	Unemployment Risk	Age	Lack of Vehicle Access
1	**11200**	**407**	**100th**	**72nd**	78th	89th	61st	72nd	67th	44th	39th	100th
2	**11000**	**280**	**94th**	**78th**	39th	83rd	83rd	44th	33rd	50th	72nd	33rd
3	**10300**	**57**	**83rd**	**89th**	100th	39th	72nd	89th	61st	83rd	67th	0th

			W/I-Rockingham County Percentiles		Rockingham County Household Counts[3]							
#	Census Tract	# of Households	Overall	Hazard Risk[2]	100 Year Coastal	100 Year Riverine FW	100 Year Riverine	500 Year Riverine	Hurr. Zone A	Hurr. Zone B	Hurr. Zone C	Hurr Zone D
1	**11200**	**407**	**100th**	**100th**	0	0	242	165	0	0	0	0
2	**11000**	**280**	**94th**	**89th**	0	0	260	20	0	0	0	0
3	**10300**	**57**	**83rd**	**61st**	0	2	37	18	0	0	0	0

1. Population Vulnerability should be interpreted as an average household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones
2. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity
3. Note that the total sum of households may be more than the households in your locality because some are located in both flood and hurricane zones

Review of FEMA Funding & Past Mitigation Projects

Review of Mitigation Projects In Your Locality

The figures below provide information regarding mitigation projects[1] in your locality from 1990-2019 that may be helpful to consider in planning potential future mitigation projects.

Total Exclusive Project Funding[1]

$774,224

This is the total amount of federal funding alloted to mitigation projects solely owned by your locality from 1990-2019

Total Shared Project Funding[1]

$162,671

This is the total amount of federal funding allotted to mitigation projects owned by your locality and at least 1 other from 1990-2019

Exclusive Projects

9

Average Project Size

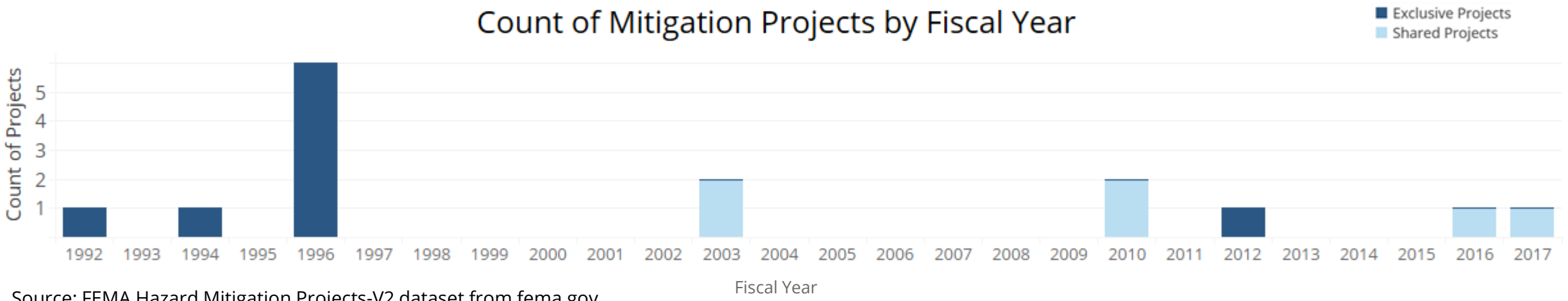
$86K

Shared Projects

6

Average Counties Per Project

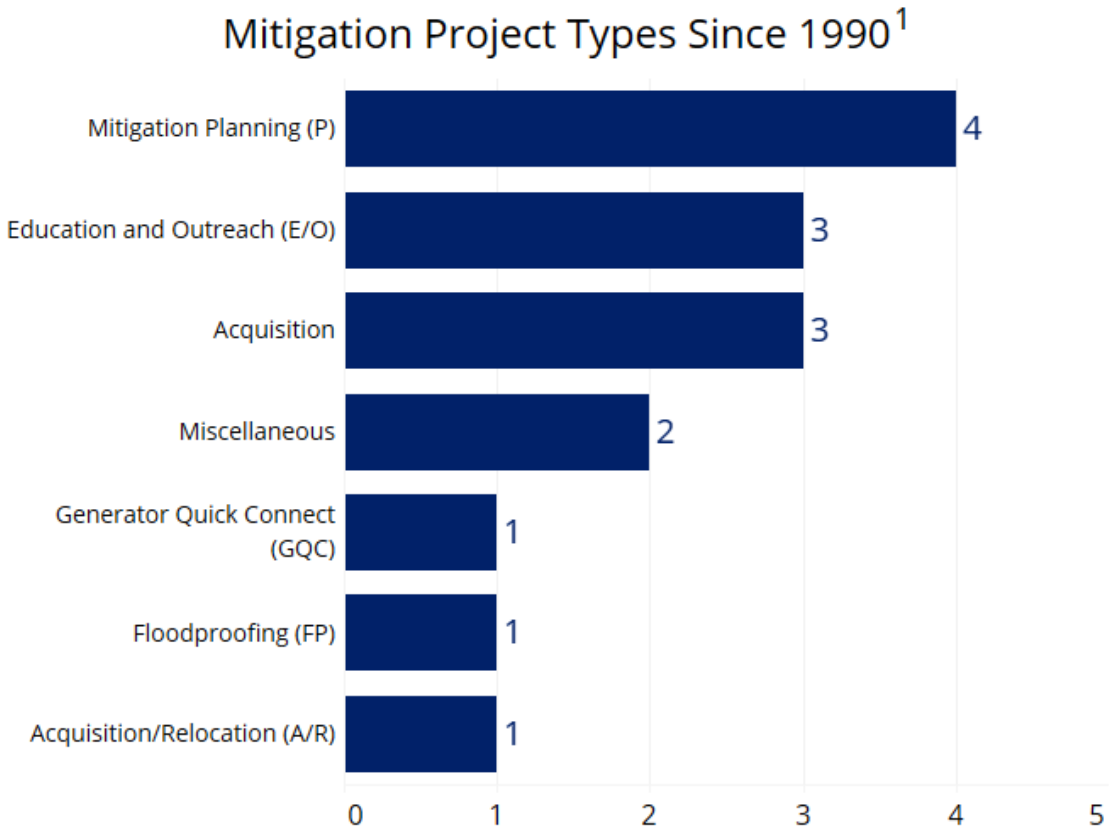
9.8

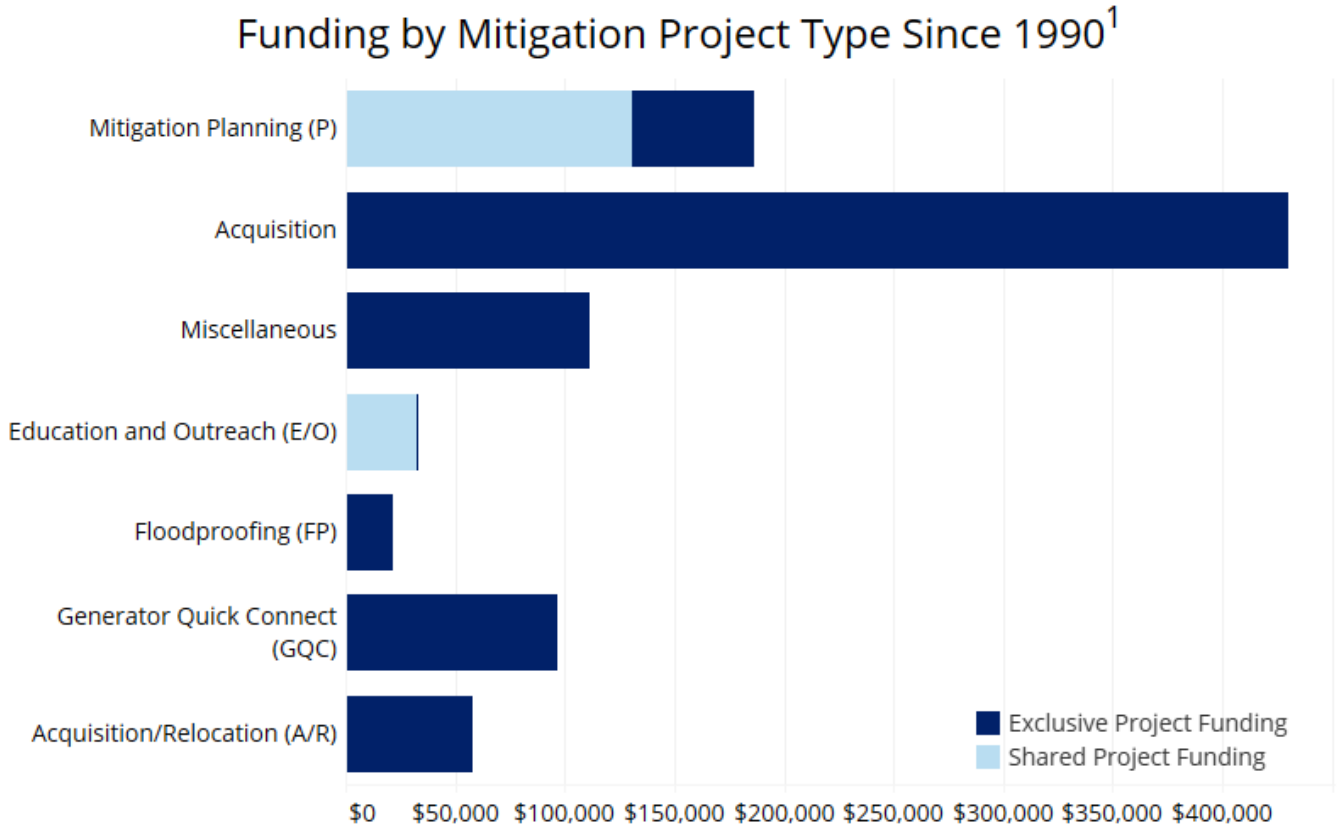


1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

Past Mitigation Projects – Top Project Types

The figures below provide information regarding mitigation projects[1] in your locality from 1990-2019 that may be helpful to consider in planning potential future mitigation projects.





1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

COVID-19 Impacts

COVID-19 In Your Locality

Since the beginning of the COVID-19 Pandemic, Rockingham County has experienced the following:

Cases[1]		Hospitalizations[1]		Deaths[1]	
Total	Per 100k	Total	Per 100k	Total	Per 100k
1,742	**2,193**	**127**	**160**	**27**	**34**
23rd out of 133 localities[2]	**39th** out of 133 localities	**18th** out of 133 localities	**39th** out of 133 localities	**32nd** out of 133 localities	**60th** out of 133 localities

1. COVID-19 case, hospitalization, and death figures are sourced from the Virginia Department of Health as of **10/26/2020**
2. COVID-19 Impact rankings are for all 133 Virginia localities, rather than the 132 included in the BRIC analysis for having at least one household in a flood or hurricane zone

Considerations for Next Steps

Considerations for Next Steps

When evaluating future mitigation project opportunities, the population vulnerability and hazard risk metrics can supplement existing measures to design mitigation projects with an equity lens.

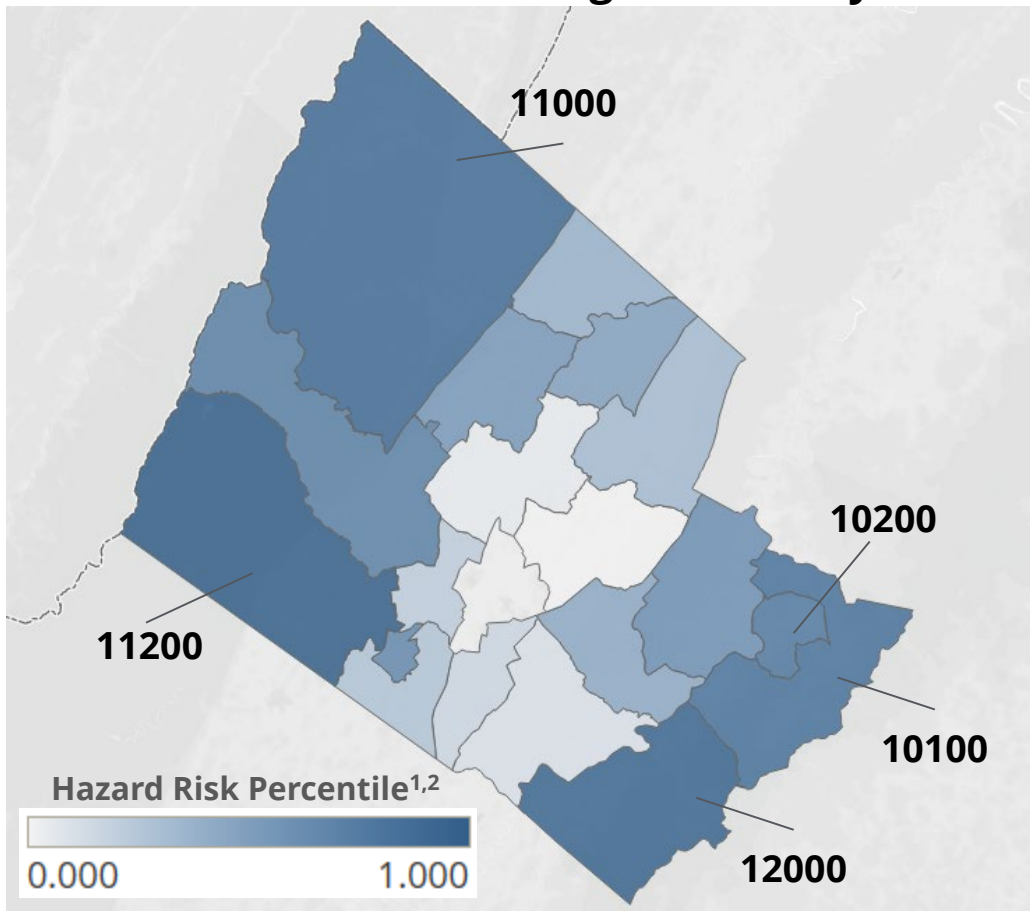
- Consider targeting **priority areas** when designing future mitigation projects
- Consider analysis at the **census tract/block level** to understand population vulnerability and hazard risks at a granular level to support decisions on mitigation projects
- Consider **supplementing these people-focused metrics** with existing infrastructure, elevation, and financial analysis for a holistic mitigation planning approach that includes equity considerations
- Consider **past project types** and **prior funding** in the overall mitigation strategy

Appendix

What areas in your locality have the greatest hazard risk?

When designing mitigation projects, it may be helpful to consider specific census tracts that have the greatest number of households residing in the more severe flood and/or hurricane zones.

Hazard Risk[1] in Rockingham County



Top-5 Census Tracts for Hazard Risk[1]

				Rockingham County Household Counts							
#	Census Tract	# of House-holds	Hazard Risk Percentile	100 Year Coastal	100 Year Riverine FW	100 Year Riverine	500 Year Riverine	Hurr. Zone A	Hurr. Zone B	Hurr. Zone C	Hurr. Zone D
1	**11200**	**407**	**100th**	0	0	242	165	0	0	0	0
2	**12000**	**344**	**94th**	0	12	62	270	0	0	0	0
3	**11000**	**280**	**89th**	0	0	260	20	0	0	0	0
4	**10100**	**146**	**83rd**	0	16	120	10	0	0	0	0
5	**10200**	**138**	**78th**	0	1	117	20	0	0	0	0

Note: see the appendix for a data table for the Top 15 Census Tracts

1. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity
2. Census tracts at the 0th percentile (areas in white) do not have households in Flood or Hurricane Zones

What is population vulnerability and how is it calculated? *continued*

The vulnerability score for each Virginia household reflects an estimate of the household's ability to safely respond in the event of an environmental disaster.

Population Vulnerability

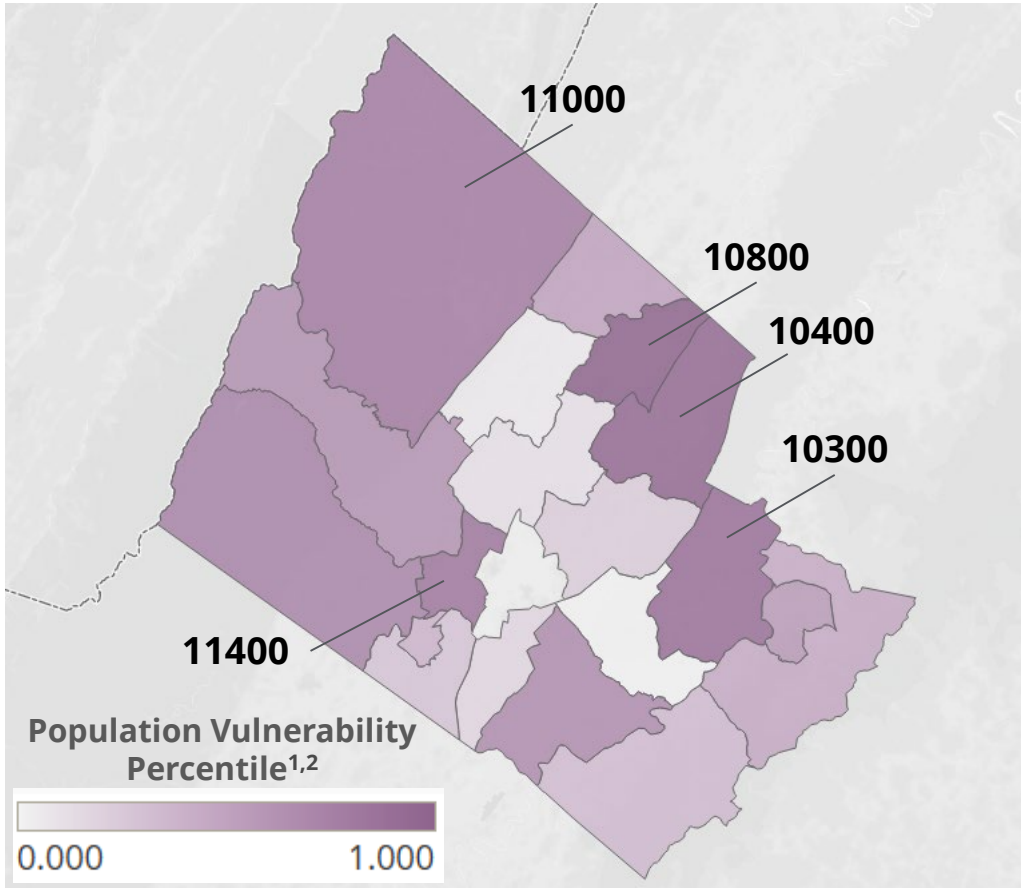
Attribute[1]	Weighting[2]	Description (in a household)
Low Income	18%	Number of adults with income less than $30,000
Elevated Health Risk	17%	Number of adults with one or more serious health conditions
Age (Older Adults)	15%	Number of adults who are age 65 and older
Communities of Color	13%	Number of Black or African American or Hispanic or Latino adults
# of Children in Household	12%	Number of children
# of People in Household	10%	Number of adults and children
Unemployment Risk	8%	Number of adults at high risk of unemployment
Lack of Vehicle Access	6%	Does the household lack access to a motor vehicle?

1. Two attributes - English as a Primary Language and Prevalence of Mobile Housing - were dropped from consideration based on the 8/20/2020 BRIC Working Group Session
2. Attribute contributions to Population Vulnerability were weighted as a result of the BRIC Working Group Session on 8/20/2020

What areas in your locality have the greatest population vulnerability?

When designing mitigation projects, it may be helpful to consider specific census tracts that are home to the most vulnerable individuals in the event of an environmental disaster.

Population Vulnerability[1] in Rockingham County



Top-5 Census Tracts for Population Vulnerability[1]

			Within-Rockingham County Percentiles								
#	Census Tract	# of House-holds	Pop. Vul.	Comm. of Color	Elevated Health Risk	Low Income	# of People	# of Children	Unem. Risk	Age	Vehicle Access
1	**10800**	**51**	**100th**	83rd	94th	89th	78th	89th	89th	22nd	72nd
2	**10400**	**33**	**94th**	89th	56th	94th	67th	78th	22nd	83rd	0th
3	**10300**	**57**	**89th**	100th	39th	72nd	89th	61st	83rd	67th	0th
4	**11400**	**27**	**83rd**	94th	78th	28th	83rd	72nd	61st	78th	78th
5	**11000**	**280**	**78th**	39th	83rd	83rd	44th	33rd	50th	72nd	33rd

Note: see the appendix for a data table for the Top 15 Census Tracts

1. Population Vulnerability should be interpreted as an average household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones
2. Census tracts at the 0th percentile (areas in white) do not have households in Flood or Hurricane Zones

Data table | Population Vulnerability & Hazard Risk

			Percentiles											Within-locality Household Counts							
#	Census Tract	# of Households	Overall	Population Vulnerability	Communities of Color	Elevated Health Risk	Low Income	# of People	# of Children	Unem-ployment Risk	Age	Lack of Vehicle Access	Hazard Risk	100 Year Coastal	100 Year Riverine FW	100 Year Riverine	500 Year Riverine	Hurr. Zone A	Hurr. Zone B	Hurr. Zone C	Hurr Zone D
1	11200	407	100th	72nd	78th	89th	61st	72nd	67th	44th	39th	100th	100th	0	0	242	165	0	0	0	0
2	11000	280	94th	78th	39th	83rd	83rd	44th	33rd	50th	72nd	33rd	89th	0	0	260	20	0	0	0	0
3	10300	57	83rd	89th	100th	39th	72nd	89th	61st	83rd	67th	0th	61st	0	2	37	18	0	0	0	0
4	10800	51	83rd	100th	83rd	94th	89th	78th	89th	89th	22nd	72nd	50th	0	0	33	18	0	0	0	0
5	10200	138	78th	56th	33rd	17th	100th	11st	50th	72nd	6th	83rd	78th	0	1	117	20	0	0	0	0
6	11100	146	72nd	61st	28th	72nd	67th	39th	39th	56th	17th	94th	72nd	0	0	82	64	0	0	0	0
7	12000	344	56th	33rd	44th	28th	56th	61st	94th	39th	11st	39th	94th	0	12	62	270	0	0	0	0
8	10100	146	56th	44th	50th	22nd	78th	50th	56th	78th	28th	56th	83rd	0	16	120	10	0	0	0	0
9	10400	33	56th	94th	89th	56th	94th	67th	78th	22nd	83rd	0th	33rd	0	0	26	7	0	0	0	0
10	11500	80	50th	39th	61st	50th	39th	28th	17th	28th	56th	67th	67th	0	0	73	7	0	0	0	0
11	11400	27	44th	83rd	94th	78th	28th	83rd	72nd	61st	78th	78th	22nd	0	0	9	18	0	0	0	0
12	10900	36	39th	50th	56th	100th	44th	33rd	6th	11st	61st	44th	39th	0	0	29	7	0	0	0	0
13	11800	16	33rd	67th	0th	67th	0th	100th	100th	0th	89th	0th	11st	0	4	7	5	0	0	0	0
14	10700	58	28th	6th	67th	6th	33rd	17th	44th	100th	33rd	50th	56th	0	0	32	26	0	0	0	0
15	11600	31	22nd	28th	0th	44th	11st	94th	83rd	17th	50th	61st	28th	0	0	23	8	0	0	0	0

1. Note: These figures only account for census areas that have households in flood and/or hurricane zones

Data table | FEMA Funding[1]

Grantee	Year of Fiscal Year	Exclusive vs Shared	Subgrantee	Project Counties	Project Type(s)	Federal Funds Obligated
ROCKINGHAM COUNTY	2017	Shared	CENTRAL SHENANDOAH..	BATH; WAYNESBORO (CITY); STAUNTON (CITY); LEXINGTON (CITY);..	91.5: Local Multijurisdictional Multihazard Mitigation Plan - U..	$76,039
	2016	Shared	Central Shenandoah ..	AUGUSTA; BATH; BUENA VISTA CITY; HARRISONBURG CITY; HIGHLAND; LE..	91.4: Local Multijurisdictional Multihazard Mitigation Plan - N..	$30,000
	2012	Exclusive	Bridgewater	ROCKINGHAM	601.1: Generators	$96,691
	2010	Shared	CENTRAL SHENANDOAH..	HIGHLAND; WAYNESBORO (CITY); ROCKINGHAM; BUENA VISTA (CITY); ..	100.1: Public Awareness and Education (Brochures, Worksho..	$6,236
			Central Shenandoah ..	AUGUSTA; BATH; BUENA VISTA CITY; HARRISONBURG CITY; HIGHLAND; LE..	91.1: Local Multihazard Mitigation Plan	$24,524
	2003	Shared	CENTRAL SHENANDOAH PLANNING DI..	BATH; AUGUSTA; ROCKBRIDGE; WAYNESBORO (CITY); STAUNTON (CIT..	100.1: Public Awareness and Education (Brochures, Worksho..	$8,847
				HIGHLAND; ROCKBRIDGE; ROCKINGHAM; BUENA VISTA (CITY); ..	100.1: Public Awareness and Education (Brochures, Worksho..	$17,025
	1996	Exclusive	BRIDGEWATER	ROCKINGHAM	800.1: Miscellaneous	$111,473
			ROCKINGHAM COUNTY	ROCKINGHAM	200.1: Acquisition of Private Real Property (Structures and Land) ..	$119,985
					201.1: Relocation of Private Structures - Riverine	$57,921
					204.1: Dry Floodproofing Private Structures - Riverine (Commerci..	$21,852
	1994	Exclusive	BRIDGEWATER	ROCKINGHAM	200.1: Acquisition of Private Real Property (Structures and Land) ..	$310,275
	1992	Exclusive	ROCKINGHAM COUNTY	ROCKINGHAM	90.4: Mitigation Plan - Local Multihazard Mitigation Plan	$56,027

1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

COVID-19 Unified Command/VEST Health Equity Working Group

MITIGATION PROJECTS ANALYSIS
BUENA VISTA CITY

NOVEMBER 2020

Topics

The analysis provides **Buena Vista City** with information to support planning and preparation of projects for the Building Resilient Infrastructure and Communities (BRIC) grant application with an equity focus.

- ❑ Introduction to Data-Driven Approach
- ❑ Hazard Risk
- ❑ Population Vulnerability
- ❑ Summary
- ❑ FEMA Funding and Past Projects
- ❑ Considerations for Next Steps

This analysis ***expands the scope of population vulnerability*** to provide a ***data-driven equity lens*** for disaster mitigation project design

Data-Driven Approach

The Health360 platform informs population vulnerability and enables a data-driven approach to operationalizing equity in mitigation projects.

Powered By Health360

230M+
U.S. Adults Scored

Data updated every
1 Month

Contains over
1,500+
variables on Social Determinants of Health and other metrics

150+
Advanced predictive algorithms

400+
Variables used in the mortality predictive algorithm

Provides 360° view of a person

Algorithms rebuilt every 2 years

40+
Clients served

What is hazard risk and how is it calculated?

Household Hazard risk reflects the number of households in each flood or hurricane zone, weighted by severity.

Hazard Risk

Number of households in each zone:

Flood zones
- 100 year coastal
- 100 year riverine flood way
- 100 year riverine
- 500 year riverine

Hurricane zones
- Segmented A, B, C, D

- Households that reside in the flood and hurricane zones are considered to be **at-risk for environmental disasters**
- Hazard Risk reflects **the number of households located in Flood and Hurricane Zones**
- Hazard Risk is not a measure of **infrastructure, elevation, or financial risks**, but is a measure of the number of at-risk households in an area, weighted by the severity of the risk, to **provide a people-focused risk metric**

Note: Severity of the risk per household is captured on an ordinal scale from 1 – least severe (Hurricane Zone D, 500 Year Riverine) to 4 – most severe (Hurricane Zone A, 100 Year Coastal)

Hazard Risk = (# of Households Analyzed in Particular Hurricane or Flood Zones) X (Specified Zone Risk Level (1 through 4 depending on risk severity))

Hazard Risk in Your Locality

The figures below indicate how your locality's hazard risk[1] compares to others in Virginia as well as how many households reside in each flood or hurricane zone.

Hazard Risk[1] Percentile

59th

Your locality has more households in more severe flood/hurricane zones than 59% of other Virginia localities

Hazard Risk[1] Rank

55th

Your locality's Hazard Risk score is ranked 55th out of 132 Virginia localities

Households in Flood Zones & Locality Rank

← Severity			
100 Year Coastal	100 Year Riverine Floodway	100 Year Riverine	500 Year Riverine
0	7	53	609
N/A out of 132 Localities	49th out of 132 Localities	100th out of 132 Localities	20th out of 132 Localities

Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk

Households in Hurricane Zones & Locality Rank

← Severity			
Zone A	Zone B	Zone C	Zone D
0	0	0	0
N/A out of 132 Localities	N/A out of 132 Localities	N/A out of 132 Localities	N/A out of 132 Localities

Evacuation zones designated as A through D are in place across coastal Virginia

1. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity
2. Note that the total sum of households may be more than the households in your locality because some are located in both flood and hurricane zones

What is population vulnerability and how is it calculated?

The Population Vulnerability score provides a people-focused metric that can be combined with infrastructure, elevation, and financial metrics to support a holistic approach to mitigation planning.

Population Vulnerability

Prevalence of:

1. Communities of color
2. Elevated health risk
3. Low income
4. # of people in household
5. # of children in household
6. Unemployment risk
7. Age (older adults)
8. Lack of vehicle access

- Population Vulnerability **expands upon the 2018 Virginia Hazard Mitigation plan definition** of population vulnerability (density and percentage of total population)
- Population Vulnerability **only considers localities with households in flood or hurricane zones (132 localities)**
- Population Vulnerability **identifies the locality and census blocks/Census Blocks** with the most vulnerable individuals/households on average
- Population Vulnerability should be interpreted as a **household's ability to safely respond** to an environmental disaster

Population Vulnerability in Your Locality

The figures below indicate how your locality's population vulnerability[1] score and composite attributes compare to other localities in Virginia.

Population Vulnerability[1] Percentile

61st

On average, a household in a flood or hurricane zone in your locality is more vulnerable than a household in 61% of other Virginia localities

Population Vulnerability[1] Rank

52nd

Your locality's Population Vulnerability score is ranked 52nd out of 132 Virginia localities

How BUENA VISTA CITY Compares to Other Localities Across the Eight Vulnerability Attributes

Low Income	Elevated Health Risk	Age	Communities of Color
89th percentile	28th percentile	53rd percentile	25th percentile

# of Children in Household	# of People in Household	Unemployment Risk	Lack of Vehicle Access
54th percentile	40th percentile	22nd percentile	36th percentile

1. Population Vulnerability should be interpreted as a household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones

Population Vulnerability & Hazard Risk Summary

Understanding population vulnerability and hazard risk in your locality can help support future mitigation projects.

Population Vulnerability[1] Percentile

61st

On average, a household in a flood or hurricane zone in your locality is more vulnerable than a household in 61% of other Virginia localities

Hazard Risk[2] Percentile

59th

Your locality has more households in more severe flood/hurricane zones than 59% of other Virginia localities

Population Vulnerability[1] Rank

52nd

Your locality's Population Vulnerability score is ranked 52nd out of 132 Virginia localities

Hazard Risk[2] Rank

55th

Your locality's Hazard Risk score is ranked 55th out of 132 Virginia localities

1. Population Vulnerability should be interpreted as a household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones
2. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity

Review of FEMA Funding & Past Mitigation Projects

Review of Mitigation Projects In Your Locality

The figures below provide information regarding mitigation projects[1] in your locality from 1990-2019 that may be helpful to consider in planning potential future mitigation projects.

Total Exclusive Project Funding[1]

$826,783

This is the total amount of federal funding alloted to mitigation projects solely owned by your locality from 1990-2019

Total Shared Project Funding[1]

$203,962

This is the total amount of federal funding allotted to mitigation projects owned by your locality and at least 1 other from 1990-2019

Exclusive Projects

2

Average Project Size

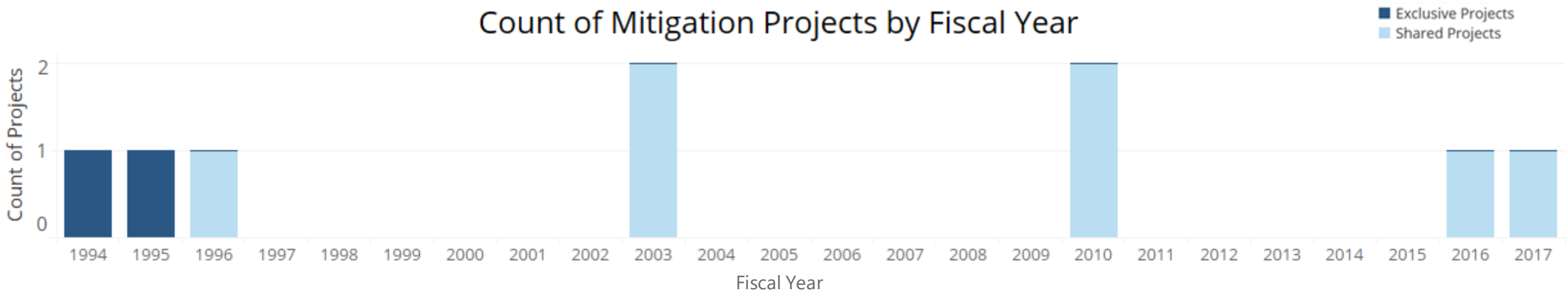
$413K

Shared Projects

7

Average Counties Per Project

8.7

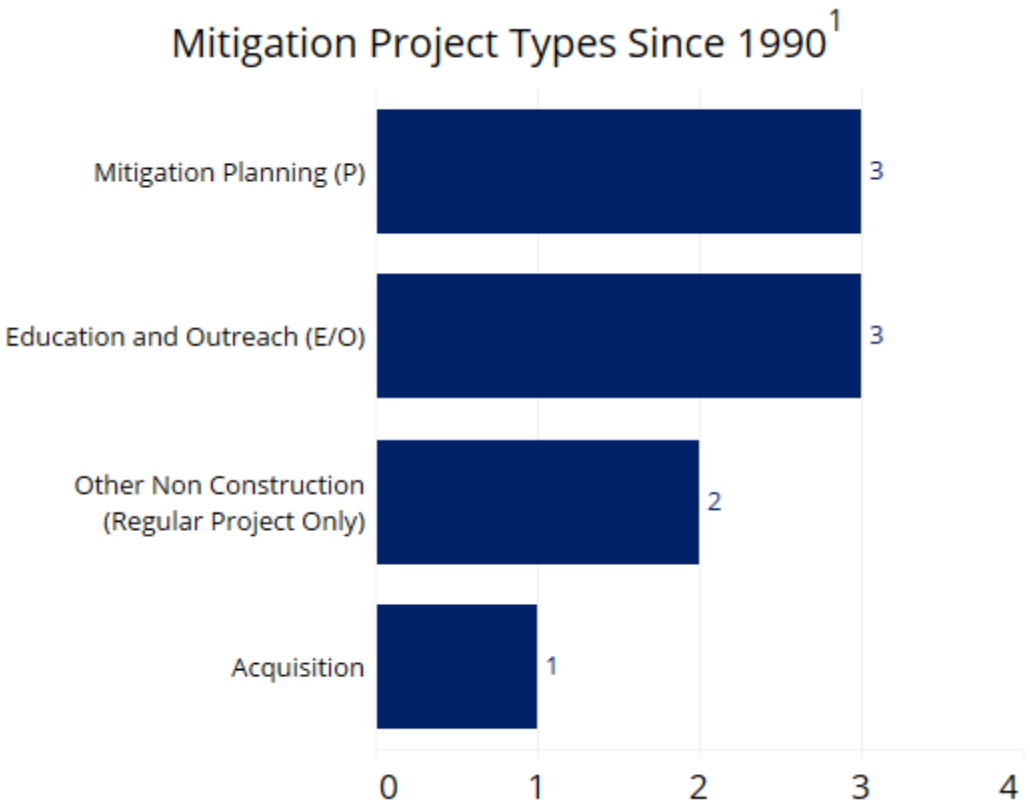


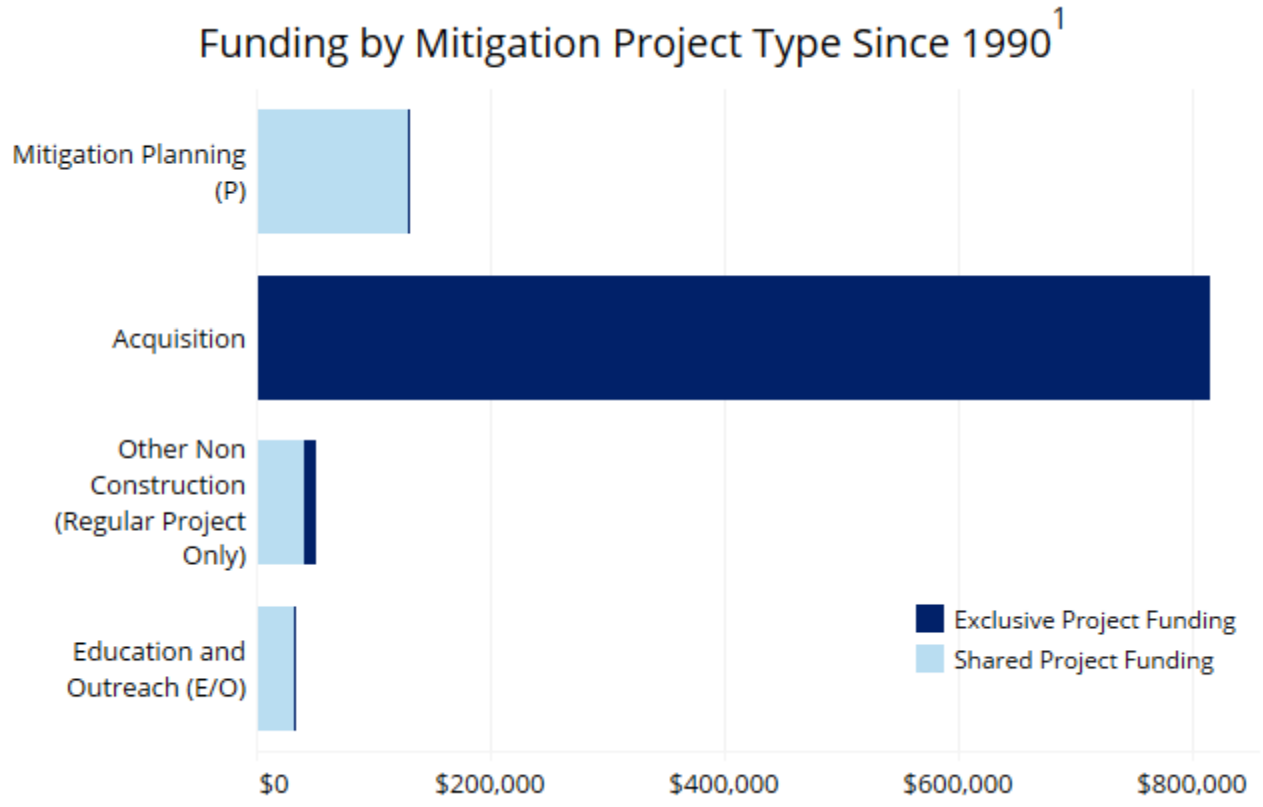
1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

Note: see the appendix for a complete data table of these mitigation projects

Past Mitigation Projects – Top Project Types

The figures below provide information regarding mitigation projects[1] in your locality from 1990-2019 that may be helpful to consider in planning potential future mitigation projects.





1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

Note: see the appendix for a complete data table of these mitigation projects

COVID-19 Impacts

COVID-19 In Your Locality

Since the beginning of the COVID-19 Pandemic, Buena Vista City has experienced the following:

Cases[1]

Total	Per 100k
121 **119th** out of 133 localities[2]	**1,891** **57th** out of 133 localities

Hospitalizations[1]

Total	Per 100k
5 **124th** out of 133 localities	**78** **95th** out of 133 localities

Deaths[1]

Total	Per 100k
1 **120th** out of 133 localities	**16** **103rd** out of 133 localities

1. COVID-19 case, hospitalization, and death figures are sourced from the Virginia Department of Health as of **10/28/2020**
2. COVID-19 Impact rankings are for all 133 Virginia localities, rather than the 132 included in the BRIC analysis for having at least one household in a flood or hurricane zone

Considerations for Next Steps

Considerations for Next Steps

When evaluating future mitigation project opportunities, the population vulnerability and hazard risk metrics can supplement existing measures to design mitigation projects with an equity lens.

- Consider **population vulnerability** and it's various components to support decisions on mitigation projects
- Consider **supplementing these people-focused metrics** with existing infrastructure, elevation, and financial analysis for a holistic mitigation planning approach that includes equity considerations
- Consider **past project types** and **prior funding** in the overall mitigation strategy

Appendix

What is population vulnerability and how is it calculated? *continued*

The vulnerability score for each Virginia household reflects an estimate of the household's ability to safely respond in the event of an environmental disaster.

Population Vulnerability

Attribute[1]	Weighting[2]	Description (in a household)
Low Income	18%	Number of adults with income less than $30,000
Elevated Health Risk	17%	Number of adults with one or more serious health conditions
Age (Older Adults)	15%	Number of adults who are age 65 and older
Communities of Color	13%	Number of Black or African American or Hispanic or Latino adults
# of Children in Household	12%	Number of children
# of People in Household	10%	Number of adults and children
Unemployment Risk	8%	Number of adults at high risk of unemployment
Lack of Vehicle Access	6%	Does the household lack access to a motor vehicle?

1. Two attributes - English as a Primary Language and Prevalence of Mobile Housing - were dropped from consideration based on the 8/20/2020 BRIC Working Group Session
2. Attribute contributions to Population Vulnerability were weighted as a result of the BRIC Working Group Session on 8/20/2020

Data table | FEMA Funding[1]

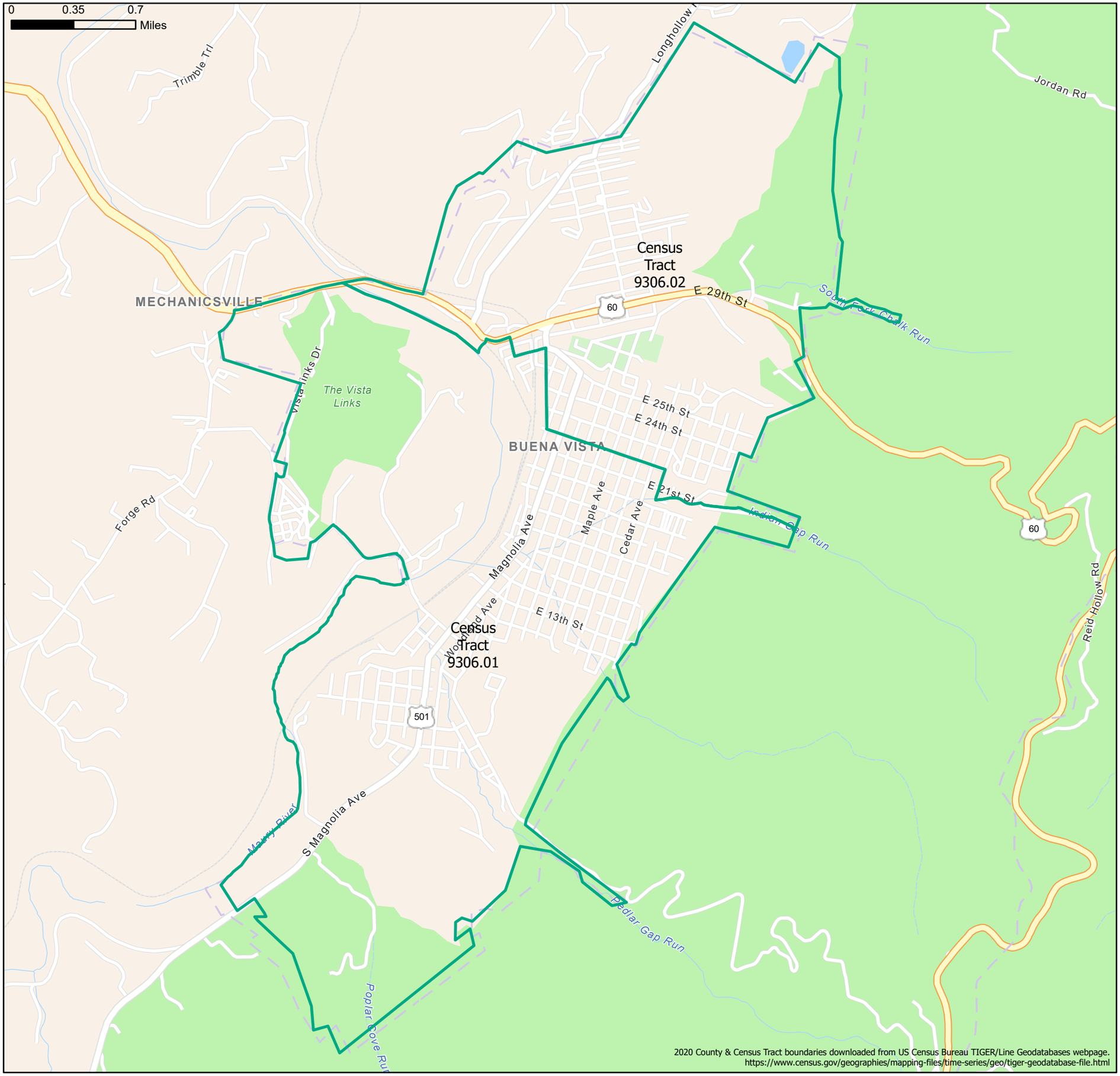
Grantee	Year of Fiscal Year	Exclusive vs Shared	Subgrantee	Project Counties	Project Type(s)	Federal Funds Obligated
BUENA VISTA CITY	2017	Shared	CENTRAL SHENANDOAH P..	BATH; WAYNESBORO (CITY); STAUNTON (CITY); LEXINGTO..	91.5: Local Multijurisdictional Multihazard Mitigation Plan - ..	$76,039
	2016	Shared	Central Shenandoah Pla..	AUGUSTA; BATH; BUENA VISTA CITY; HARRISONBURG ..	91.4: Local Multijurisdictional Multihazard Mitigation Plan - ..	$30,000
	2010	Shared	CENTRAL SHENANDOAH P..	HIGHLAND; WAYNESBORO (CITY); ROCKINGHAM; BUENA..	100.1: Public Awareness and Education (Brochures, Worksh..	$6,236
			Central Shenandoah Pla..	AUGUSTA; BATH; BUENA VISTA CITY; HARRISONBURG ..	91.1: Local Multihazard Mitigation Plan	$24,524
	2003	Shared	CENTRAL SHENANDOAH PLANNING DIST COMMISSION	BATH; AUGUSTA; ROCKBRIDGE; WAYNESBORO..	100.1: Public Awareness and Education (Brochures, Worksh..	$8,847
				HIGHLAND; ROCKBRIDGE; ROCKINGHAM; BUENA VISTA ..	100.1: Public Awareness and Education (Brochures, Worksh..	$17,025
	1996	Shared	BUENA VISTA	ROCKBRIDGE	106.1: Other Non Construction (Regular Project Only)	$41,291
	1995	Exclusive	BUENA VISTA	BUENA VISTA	200.1: Acquisition of Private Real Property (Structures and ..	$816,116
	1994	Exclusive	BUENA VISTA	BUENA VISTA	106.1: Other Non Construction (Regular Project Only)	$10,667

1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

Buena Vista city

2020 Census Tract

VDEM GIS | 5/21/2021

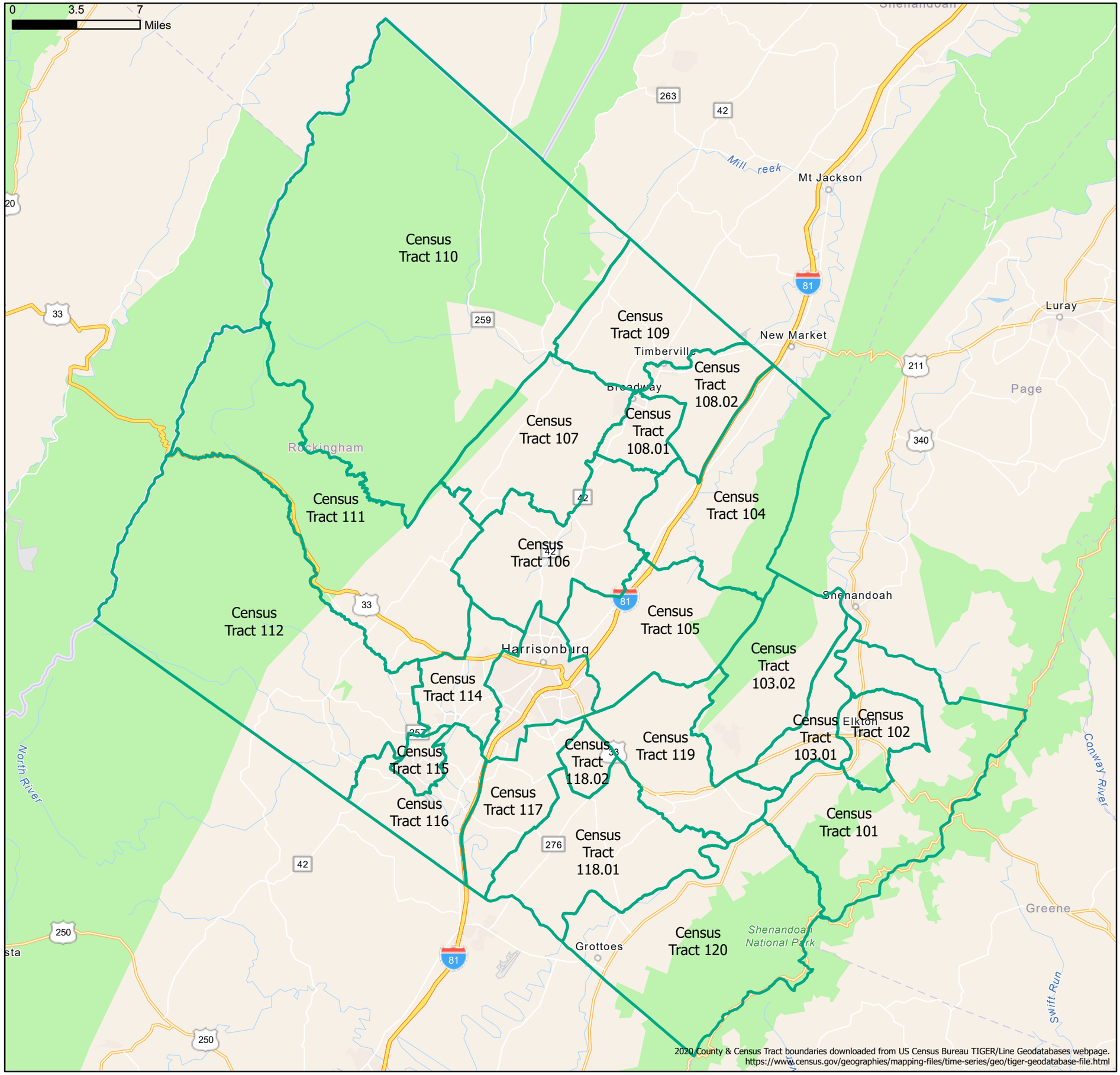


2020 County & Census Tract boundaries downloaded from US Census Bureau TIGER/Line Geodatabases webpage.
https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-geodatabase-file.html

2020 Census Tract

Rockingham County

VDEM GIS | 5/21/2021



2020 County & Census Tract boundaries downloaded from US Census Bureau TIGER/Line Geodatabases webpage.
https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-geodatabase-file.html